CONTACTORS, KS-5757, KS-15072, KS-15674 AND CONTACTORS HAVING NO KS- DESIGNATIONS ALLEN-BRADLEY COMPANY AND WESTINGHOUSE CORPORATION REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.001 This addendum supplements Section 026-365-701, Issue 4-D.

1.002 This addendum is issued to specify the use of KS-19578 L1 trichloroethane wherever KS-8372 trichloroethylene is now specified. The same precautions that apply for KS-8372 trichloroethylene shall apply to the KS-19578 L1 trichloroethane.

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REPLACING PAGE ADDENDUM
Filing Instructions:
1. REMOVE FROM THE SECTION THE PAGES NUMBERED THE SAME AS THOSE ATTACHED TO THIS PINK SHEET.
2. INSERT THE ATTACHED PAGES INTO THE SECTION IN THEIR PLACE.
3. PLACE THIS PINK SHEET AHEAD OF PAGE 1 OF THE SECTION.

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1. GENERAL

1.001 This addendum supplements Section 026-365-701, Issue 4-D. The attached pages must be inserted in the section in accordance with the filing instructions above.

1.002 This addendum is issued for the following reasons:

- To revise 2.08
- To specify the use of KS-19578 L1 trichloroethane in 3.001 and 3.02

Attachments:

Page 5, dated December 1970, revised
Page 6, dated December 1970, revised

2. REQUIREMENTS

The following change applies to Part 2 of the section:

(a) 2.08—revised

3. ADJUSTING PROCEDURES

The following changes apply to Part 3 of the section:

(a) 3.001—revised

(b) 3.02—revised

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1. GENERAL

1.01 This section covers the following contactors. Some have KS- designations, the remainder having only the manufacturer's code number.

ALLEN-BRADLEY	WESTINGHOUSE
KS-5757	Type 204-SM
KS-15072	Type 208-SM
KS-15674	
Bulletin 202	
Bulletin 702	

1.02 This section is reissued to transfer information as follows: Allen-Bradley, Ward Leonard, and Westinghouse relays to Section 040-811-701, Automatic Switch relays to Section 040-804-701; Struthers-Dunn relays to Section 040-810-701; and Automatic Switch transfer switches to Section 030-790-701. In addition, Cutler-Hammer relays and contactors have been removed and Allen-Bradley KS-5757, KS-15072, KS-15676, and Bulletin 702 contactors added. The title of this section has been changed.

1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 *Phi (ϕ):* Requirements are marked with a phi when they are not required to be checked before turnover.

1.05 *Asterisk (*):* Requirements are marked with an asterisk when to check for them would necessitate dismantling or dismounting of apparatus, or would affect the adjustment involved, or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons, or its performance indicates that such a check is advisable.

1.06 For the purpose of this section, whether contacts are ***normally open*** (NO) or ***normally closed*** (NC) depends on the position of these contacts when no operating current is flowing in the series coil and not on the position the contact may normally be in for a particular application. It should be noted that current in the shunt coil does not produce operation of the contactor.

1.07 A contactor is said to ***release*** when the armature or plunger has moved sufficently for normally open contacts to open and normally closed contacts to close with reliable contact.

1.08 A contactor is said to ***operate*** when the armature or plunger has moved sufficiently for normally closed contacts to open and normally open contacts to close with reliable contact.

1.09 ***Caution: Before performing any work on the contactor or checking requirements other than electrical or temperature requirements, disconnect the contactor from the power supply. If the contactor operates in an automatic control circuit, the automatic control should be made inoperative as described in the appropriate section covering the apparatus.***

1.10 Where the construction is such that adjustments are not practicable, failure of a contactor to operate satisfactorily should be corrected by replacing the appropriate parts or the entire unit.

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Fig. 1 – Contactor, KS-15072, and Bulletin 202 25-Ampere Size

Allen-Bradley Solenoid Contactors Have Silver Alloy Contacts
—Never Clean, Dress, or File Them!
Even though contacts appear pitted and burned, or are entirely black, they will give satisfactory operation. Contacts need replacement only when the silver alloy has been worn away.
Milwaukee
Allen-Bradley Co.
Wisconsin

Fig. 2 – Contactor, KS-15072, 50-Ampere Size

Fig. 3 – Contactor, Westinghouse Type 204-SM

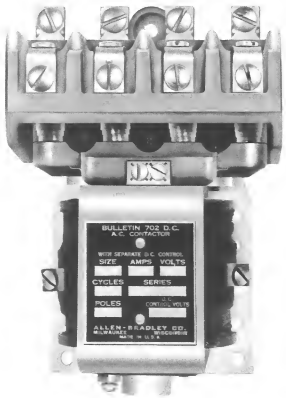

Fig. 4 — Contactor, Bulletin 702, 25-Ampere Size

1.11 Orders for parts needed for replacement should give the nameplate data of the contactor, including manufacturer's name, type or bulletin number, and serial number, KS and list numbers if any, together with a description of the part.

2. REQUIREMENTS

ϕ**2.01** ***Mounting:*** The contactor shall be fastened securely to its mountings. Fasteners holding components together shall be secure.

Gauge by feel.

Caution: Do not touch or short-circuit live terminals or parts.

ϕ**2.02** ***Cleaning Contacts and Removing Buildups:*** Contacts shall be clean and free from buildups which might interfere with reliable contact.

Gauge by eye.

ϕ**2.03** ***Contact Alignment:*** Each pair of contacts shall be aligned so that, when the contactor is operated, the outer edge of one contact does not overlap the outer edge of the other by more than 1/8 of its diameter or width. In no case shall the overlap exceed 1/8 inch.

Gauge by eye.

2.04 ***Contact Sequence***

(a) All main contacts of multipole contactors shall make or break approximately at the same time.

Gauge by eye or use an 81A test set (buzzer) as necessary.

2.05 ***Contact Pressure and Follow***

(a) Contact pressure, as measured with the contacts closed, shall be as specified in the Circuit Requirements Table.

Use gram gauge or spring balance, as applicable.

(b) There shall be additional movement of the operating mechanism after contacts touch. This usually results in sliding of the contacts or increase in the contact pressure and is known as follow.

Gauge by eye and use buzzer or lamp, if necessary.

(c) When not specified in the Circuit Requirements Table, the contact pressure or follow shall be as specified in the following table.

CONTACTORS ALLEN-BRADLEY	CONTACT PRESSURE OR FOLLOW MIN
KS-5757 KS-15072 KS-15674 Bul 202, Bul 702	1/16-inch follow

WESTINGHOUSE	MIN	MAX
Type 204-SM	10 pounds	13 pounds
Type 208-SM	10 pounds	13 pounds

Use the R-2481 spring balance.

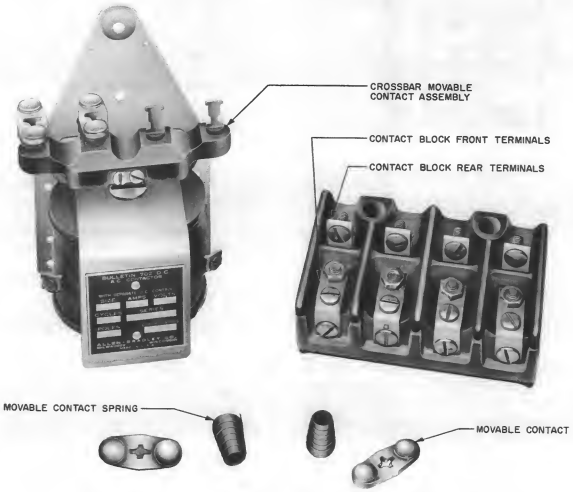

Fig. 5 — Typical Allen-Bradley Contactor (bulletin 702 shown)

2.06 ***Freedom of Operation:*** The operating mechanism shall move freely without binding.

Gauge by feel.

2.07 ***Electrical Requirements***

(a) The contactor shall meet the electrical requirements specified in the Circuit Requirements Table or other job information.

(b) Where electrical requirements are not specified in the Circuit Requirements Table, operation of the contactor shall be checked at the minimum coil voltage specified on the nameplate. Where coil voltage is not specified, normal operation of the contactor is considered a satisfactory check.

(c) Check of electrical requirements may be at the temperature at which the contactor is found unless H (hot) or C (cold) is specified in the Circuit Requirements Table.

(d) Where H is specified in the Circuit Requirements Table without heating instructions, the operating coil shall be energized for at least 1 hour to the test.

(e) Where C is specified in the Circuit Requirements Table without cooling instructions, the operating coil shall be de-energized for at least 2 hours prior to the test.

2.08** ***Temperature: The rise in temperature of the contactor parts above an ambient temperature between the limits of 10 C and 40 C shall not exceed the following.

Coils	MAXIMUM RISE ABOVE AMBIENT
Class A Insulation	65 C (117 F)
Class B or H Insulation	85 C (153 F)
Contacts (measured at the terminals)	65 C (117 F)

Use a thermometer.

If the temperature is thought to be excessive, check as follows. Hold the bulb of the thermometer against the hottest spot in question, covering the part of the bulb not in contact with the part being measured by a pad of asbestos. Observe the highest temperature indicated after it has stabilized.

Caution: Various parts reach temperatures at which it is dangerous to touch them.

3. ADJUSTING PROCEDURES

3.001 ***List of Tools, Gauges, Materials, and Test Apparatus***

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
46	3/8-inch Hex. Single-End Socket Wrench
373D	Contact Burnisher Holder
374A	Burnisher Blade
417A	1/4- by 3/8-Inch Hex. Open Double-End Flat Wrench
418A	5/16- by 7/32-Inch Hex. Open Double-End Flat Wrench
KS-2662	File
KS-6320	Orange Stick
KS-14208 (2 reqd)	Brush
R-1542	6-Inch Single-End Adjustable Wrench
—	P Long-Nose Pliers
—	3-Inch Screwdriver
—	4-Inch E Screwdriver
GAUGES	
R-1032, Detail 1	Thermometer −5° to +150C
R-2481	0-30 Pounds Spring Balance
MATERIALS	
KS-2423	Cotton Twill Cloth
KS-7187	Bond Paper
KS-19578 L1	Trichloroethane
—	Abrasive Cloth, 150 Grade
—	Asbestos Pad
—	1-Ounce Bottle

CODE OR SPEC NO.	DESCRIPTION
TEST APPARATUS	
35 Type	Test Set
81A	Test Set (buzzer)

3.01 ***Mounting*** (Reqt 2.01)

(1) Tighten loose mounting screws and terminal nuts.

Note: Be sure that the coil positioning screws on the Allen-Bradley contactors are secured and the coil terminals are positioned away from the frame of the contactor.

3.02 ***Cleaning Contacts and Removing Buildups*** (Reqt 2.02)

(1) ***General***

(a) Before cleaning contacts or removing buildups, disconnect the power supply from the contacts. (Refer to 1.10.)

Caution: Be sure to disconnect the power supply before removing the arc hood covers of the contactors. Never operate the contactors with covers removed.

(b) Silver contacts of the contactors must be replaced before the silver is completely gone. Do not file or use sandpaper or abrasive cloth on the contacts as it only results in a loss of silver and a reduction of life. Clean as in (2) or smooth with a burnisher as in (3). If buildups are excessive, the contacts should be replaced.

(c) Replace contacts which are badly worn. When replacing worn movable contacts of a control relay, or elsewhere when necessitated by the construction, install a complete contact spring.

(2) ***Cleaning Contacts:*** To remove dirt and gummy substance, clean the contacts with ♦KS-19578 L1 Trichloroethane♦ as covered in (a) and (b) and then brush them with a dry, clean KS-14208 brush as covered in (c).

(a) Pour a small quantity of the trichloroethane into a 1-ounce bottle. It is important to avoid the use of contaminated trichloroethane in cleaning the contacts. Therefore, discard the trichloroethane as soon as it appears slightly dirty.

(b) Dip the hairs of a clean KS-14208 brush their full length in the trichloroethane. Remove excess fluid by wiping the brush on the edge of the bottle. Then, with the pair of contacts open, brush the entire surface of the contact to be cleaned with the moist brush.

(c) Brush the contacts with a dry, clean KS-14208 brush.

(3) ***Removing Buildups:*** There shall be as little smoothing of contacts as is consistent with satisfactory operation. Contacts should be smoothed while closed, where practicable. To remove buildups use the 374A burnisher blade held in the 373D contact burnisher holder. Insert the blade between the contacts and move it back and forth until the buildups are reduced enough to ensure reliable contact. Exercise care to avoid reducing the height of the contact. After burnishing, brush the contacts with a dry KS-14208 brush. For large copper contacts, a KS-2662 file may be used, if necessary. Clean the contacts as outlined in (2) after smoothing.

Allen-Bradley Contactors

(4) Access to the main contacts can be made by removing the arc chamber. Use the 3-inch screwdriver for the smaller contactor and the R-1542 adjustable wrench for the larger. The instruction relative to the contacts, "Never clean, etc" which appears on some nameplates refers to the use of a file. If the contacts fail to meet the requirements for freedom from buildups, they may be smoothed with the burnisher or with 150 grade abrasive cloth while the arc chamber is removed. If any of the contacts should require replacement, replace the entire set. The stationary contacts are replaced by replacing the entire arc chamber in which they are mounted. To replace the movable contacts, press down with the fingers, rotate the con—

tact bar 90 degrees, and lift it off the stud. Install the new contacts by a reverse operation.

3.03 ***Contact Alignment*** (Reqt 2.03)

(1) Where feasible, correct by making necessary adjustments with pliers. In other cases, correct by loosening the bolts which hold the contact carrying arm on the shaft to obtain play, and moving the arm as required. Tighten the bolts before leaving.

(2) If alignment cannot be obtained, make replacements as required.

3.04 ***Contact Sequences*** (Reqt 2.04)

(1) In checking the contact sequence, see that the arc chambers of the Allen-Bradley contactors are in place. It will also be necessary to clear the contacts being checked from the external circuit by the removal of leads, and to connect buzzers or equivalent to indicate the operation of the contacts.

(2) To check the operating sequence, close the contactor slowly by hand, by applying an upward pressure to the underside of the armature assembly, and observe the operation of the contacts as indicated by the buzzers.

(3) If contacts do not make or break approximately at the same time, inspect the group for any that are out of alignment with the others. Correct by shaping the contact springs with the P-long-nose pliers or raising or lowering stationary contact assemblies, as required, to bring them into alignment with the others of the group. When the contacts are supported by heavy members which cannot be shaped with the pliers, check for mechanical trouble which may require the replacement of parts. Check 2.03, 2.05, 2.06, and 2.07 after any change.

3.05 ***Contact Pressure and Follow*** (Reqt 2.05)

Allen-Bradley Contactors

(1) When checking the contacts for follow, close the contactor slowly by hand, observing the distance the support can move after the contact is first made. An 81A test set (buzzer) connected across the contacts will be helpful in determining the point at which they make.

(2) In general, correction for the lack of follow involves either the adjustment of contacts to increase the contact pressure or if this is not feasible, the replacement of weakened springs or other appropriate parts.

Westinghouse Contactors

(3) To check the contact pressure of NC contacts, attach a short loop of cord around the movable contact and insert a small piece of KS-7187 bond paper between the contact surfaces. Hook the gauge or spring balance in the loop and pull away from the stationary contact. Observe the indication of the gauge or spring balance at the instant the paper can be moved.

(4) To check the contact pressure of NO contacts, proceed as above with the contactor operated. The contactor may be operated manually or electrically by means of a temporary connection to the operating coil. See that the contacts are not connected to the service voltage while being handled.

(5) If the requirement is not met, examine the contacts and contact support for mechanical trouble. Replace weak contact spring and badly worn contacts as necessary.

3.06 ***Freedom of Operation*** (Reqt 2.06)

(1) Operate the apparatus manually, after disconnecting it from the power service. Look for sticking or binding and remove the cause. Remove dirt from the surface of the plunger or armature. Clean with KS-8372 trichloroethylene on a KS-14666 cloth wrapped around the KS-6320 orange stick, as required. Avoid the use of oil.

3.07 ***Electrical Requirements*** (Reqt 2.07)

(1) A check of the operation of a contactor is made as follows. With power removed from the contactor as covered in 2.10, connect

the coil of the contactor across the output of a 35-type test set equipped with a voltmeter. Adjust the output of the 35-type test set to the value specified in the Circuit Requirements Table.

(2) Failure to operate with rated voltage at the coil terminals may sometimes be corrected by readjustment, but, in some cases, may be due to an open coil. To check for an open coil, connect the voltmeter in series with the operating voltage and the coil. The absence of an indication on the voltmeter when so connected shows that the coil is open and should be replaced.

(3) If the contactor does not release check for binding of the armature, solenoid linkage, etc, and remove the cause. When any change is made in mechanical settings, care should be taken that the other requirements continue to be met.

3.08 ***Temperature*** (Reqt 2.08)

(1) If the temperature exceeds the specified limit, see that the other requirements are met. If these requirements are met and the temperature is above the specified limit, refer the matter to the supervisor as the coil or the contacts may have to be replaced.